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INFORMATION SYSTEMS CAREERS AND
HUMAN RESOURCE MANAGEMENT

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<u>Introduction</u>

The organizational position of Information Systems (I/S)
professionals within large corporations has become particularly
interesting over the last five years or so. Some firms have created
I/S departments where none existed before; others have turned I/S
departments into independent divisions. Information Systems have
proliferated and grown in a wide range of industries at a rate which
few people would have expected a decade ago. At the same time, the
supply of I/S personnel has lagged behind the growing demand for
them. The unemployment level for this category of professionals is
barely above one percent. Turnover rates have exceeded 25%
annually. Recruitment costs have risen, and salaries for new I/S
hires often approximate those of senior I/S personnel.

These are a few of the reasons why it has become critical for
companies with I/S departments or divisions to pay closer attention
to the career structures and motivations of I/S personnel, from the
level of programmer to that of I/S director. This paper is based on
a survey of 800 I/S professionals at eighteen firms in a variety of
industries. The respondents were grouped into two categories:
non-managerial personnel, including programmers, analysts, technical

staff and project leaders; and management, including project managers, technical staff managers, systems development managers and I/S directors. By examining these people's views of their jobs, their careers, their employers and their managers, it will be possible to suggest some approaches top managements and personnel departments might adopt to anticipate and/or minimize the problems associated with the unique characteristics and needs of I/S professionals.

We begin with a brief description of the career-related perceptions and desires of the non-managerial respondents.* We then proceed to a discussion of the managers' perceptions and motivations. Finally, we conclude with a consideration of the top management approaches and human resource policies implied both by a series of impending technological changes in the I/S field and the results of our data analysis.

I/S Careers

I/S professionals have typically been conceived of as being grumbling technicians who resent the interference of employers, managers or colleagues in their work. These supposedly isolated creatures are thought to be considerably more at ease with electronic devices than with co-workers.

Above all, I/S personnel are often thought to be enigmatic and mysterious. Many managers believe they simply can't be managed. The implications of this conception are straight forward: it is very difficult to shape or affect the perspectives and career paths of

*A criteria for inclusion in our sample was that respondents have some managerial or supervisory experience. Our classification here refers to the sample's responsibilities in their current job classification.

such people. This conclusion would be distressing if it were true, given the pressing demand for and high turnover levels among I/S personnel. Under these circumstances, it is particularly important precisely for I/S managers to understand their employees and to keep them satisfied and productive.

Luckily, the standard view of I/S personnel is not entirely accurate. On a number of important dimensions I/S personnel and managers have clear preferences regarding their work environments and their relationships with subordinates, supervisors, managers and employers. And these preferences do not entirely coincide with those suggested by mainstream perceptions.

Our research results indicate that the concept of I/S professionals as "loners" is probably inaccurate. For example, 90% of our respondents agreed or agreed strongly with the statement: In my particular job, I have a good working relationship with peers in the company. On the other hand, our analysis does support the notion that I/S professionals identify more strongly with their occupations and technologies than they do with the organizations they work in. But this does not mean they are innately anti-social or anti-organizational. The question that interests us here is how the organization can foster company loyalty and emphasize the non-technological (e.g., consulting, business, user-liaison) skills that are required more and more frequently of the successful I/S professional.

All respondents felt particularly strongly that their employers should actively participate in their career development. The technical staff, programmers and systems analysts in our survey were all adamant on this point. They also agreed strongly with the

Table 1: NON-MANAGERIAL RESPONDENTS' VIEWS ON
EMPLOYER INVOLVEMENT IN I/S CAREER DEVELOPMENT

		Programmers	Systems Analysts	Technical Staff	Project Leaders
Expect Employer Participation	agree/strongly agree	72	70	82	66
	neutral	16	27	12	33
	disagree/strongly disagree	12	3	6	6
Believe Employer Should Only Provide Career-Related Information	agree/strongly agree	9	5	6	6
	neutral	7	19	7	0
	disagree/strongly disagree	84	76	87	94
Believe Employer Should Not be Involved at All	agree/strongly agree	2	2	0	6
	neutral	44	6	6	0
	disagree/strongly disagree	84	92	94	94

Table 2: NON-MANAGERIAL RESPONDENTS' VIEWS ON
CAREER-COUNSELING WITH PERSONNEL DEPARTMENT VS. MANAGEMENT

Question: How important is it for your employer to provide the following?

	Programmers	Systems Analysts	Technical Staff	Project Leaders
Regular counseling with Personnel Department — important/very important	24	36	29	23
neutral	34	36	50	41
unimportant/very unimportant	42	28	21	36
Regular counseling with Management — important/very important	62	66	72	59
neutral	14	24	14	24
unimportant/very unimportant	24	10	14	17

proposition that their employers should do more than simply provide information about their I/S employees' career developments. (See Table 1.) Moreover, many prefer that their own supervisors and managers -- as opposed to personnel departments -- take the lead in helping them to develop their careers. (See Table 2.) Among the programmers, systems analysts, technical staff and project leaders, only the latter group included even a small percentage holding that employers should not be involved in their employees' career developments.

Several specific kinds of employer contributions are valued consistently highly by I/S personnel in these job categories. Both in-house technical and management training are popular across all the non-managerial job categories. Systems analysts and technical staff also place high priority on the provision of funds for outside training, and on gaining the experience and education required for advancement within their firms. Technical staff were particularly vehement about these and a number of other employer contributions to career development, among them career counseling, clear career path descriptions, regular counseling with management, and time off for career-related education. (See Table 3.)

I/S employees in these non-managerial categories also appeared to have unambiguous views about the qualities they considered to be important in their immediate supervisors. What they valued most highly in their managers was emotional stability. They also wanted their managers to be able to make quick decisions, and to have a good rapport with employees. (Also important were willingness to delegate authority, general accessibility, the confidence of executive management, an adequate user interface and familiarity with corporate

Table 3: NON-MANAGERIAL RESPONDENTS' PREFERENCES REGARDING
EMPLOYER CONTRIBUTIONS TO I/S CAREER DEVELOPMENT

% considering important or very important	Programmers	Systems Analysts	Technical Staff	Project Leaders
Career Aptitude Testing	27	33	33	6
Career Counseling	56	52	66	47
Experience/Education Necessary to Advance within the Firm	58	72	80	56
Clear Career Paths	55	61	67	44
In-House Technical Education	71	81	67	58
In-House Management Education	72	83	73	76
Money for Outside Training	61	72	78	75
Time off for Career-Related Education	53	67	71	65

Table 4: NON-MANAGERIAL RESPONDENTS' VIEWS ON THE QUALITIES IMPORTANT IN THEIR SUPERVISORS AND MANAGERS

Quality	Rating
ability to make quick decisions	(3.90)
emotional stability	(4.30)
willingness to delegate authority	(4.17)
accessibility	(4.15)
knowledge of corporate policies	(3.65)
rapport with employees	(4.26)
the confidence of executive management	(4.10)
ability to interface with users	(4.14)
ability to interface with vendors	(3.41)
knowledge of corporate goals	(3.98)
technical expertise	(3.71)

- (5) very important
- (4) important
- (3) neutral
- (2) unimportant
- (1) very unimportant

goals. Technical expertise was, surprisingly, considered to be far less important than these managerial characteristics.) (See Table 4.)

The responses of I/S managers were different from those of the lower-level respondents. Again, however, the popular conception of their motivations does not entirely coincide with our results. The accepted description of such a manager emphasizes his/her roots in a so-called "technical wonderland", (Martin, 1981) and the conflicts that arise from that background. In fact the picture is more complex. For example, an I/S manager's staff is likely to consider him/her to be a general manager, while senior management is more apt to think of this person as a technical wiz. In either case, the managerial respondents agreed with the non-managerial respondents that technical expertise is not particularly important in one's immediate supervisor/manager. Thus, where top management does consider its I/S personnel to be mere technicians, they may inadvertently be preventing them from expanding into other areas.

During the 1970s it was still possible for many I/S managers to expend the major part of their energies on keeping pace with the changes in the states of their respective technological arts. At the time, an I/S manager's role in strategy-making or in shaping broad corporate goals was considered to be relatively minor. (Lauer and Sbarbaro, 1982) Currently, impetus from both outside and inside the firm suggests the need for more broadly qualified I/S managers. The environmental pressures in this direction include changes in the technology and in the market for I/S products and services. (This is discussed in more detail below.) Inside the firm new hardware and software technologies stimulating changes which affect the character, needs and potential contributions of I/S personnel, and the demands made by users.

The need for more than technical competence is increasing. At the same time, however, it has been noted that "Management Information Systems Executives are the business world's poor little rich boys -- well paid, but still excluded." (Price, 1982) It is self-evident that broad-based management skills will not emerge among higher-level personnel until top management does something to foster these skills. To do that, it is not only necessary to understand what I/S managers expect and want in their work environments and career developments, but it is imperative for general management to reward managers with these skills by their inclusion in top management circles.

Our survey data included four management-level job classifications: project manager, systems development manager, technical staff manager, and I/S director. Of these, systems development managers felt most strongly about the need for employers' participation in the development of I/S careers, and disagreed most intensely with the proposition that employers' obligations ended with providing employees with career-related information. (See Table 5.)

The I/S directors considered it most important that employers offer career counseling; other forms of employer involvement were less heartily endorsed by the director respondents, though they also valued in-house management education, funds for outside training, and time off for such education. Project managers placed their highest priority on funds for outside training and on in-house management education. (See Tables 6 and 7.)

Respondents in the management categories considered familiarity with corporate goals and the confidence of senior management to be

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Table 5: MANAGERIAL RESPONDENTS' VIEWS ON
EMPLOYER INVOLVEMENT IN I/S CAREER DEVELOPMENT

		Project Manager	Systems Development Manager	Technical Staff Manager	I/S Director
Expect Employer Participation	agree/strongly agree	84	91	82	85
	neutral	16	5	0	0
	disagree/strongly disagree	0	4	18	15
Believe Employer Should Only Provide Career-Related Information	agree/strongly agree	4	0	9	0
	neutral	8	9	9	23
	disagree/strongly disagree	88	91	82	77
Believe Employer Should Not Be Involved At All	agree/strongly agree	0	4	0	0
	neutral	9	0	19	8
	disagree/strongly disagree	91	96	81	92

Table 6: Managerial Respondents' Views on
Career Counseling with Personnel Departments vs. Management

		Project Manager	Systems Development Manager	Technical Staff Manager	I/S Director
Regular Counseling with Personnel Department	important/ very important	27	10	0	42
	neutral	36	40	60	42
	unimportant/ very unimportant	37	50	40	16
Regular Counseling with Management	important/ very important	83	45	73	67
	neutral	9	30	18	25
	unimportant/ very unimportant	8	25	9	8

Table 7: Managerial Respondents' Preferences Regarding
Employer Contributions to I/S Career Development

(% Considering important or very important)	Project Managers	Systems Development Managers	Technical Staff Managers	I/S Directors
Career Aptitude Testing	30	30	9	36
Career Counselling	52	35	55	92
Experience/Education necessary to Advance within firm	80	55	82	75
Clear Career Paths	74	45	55	69
In-House Technical Education	67	45	91	75
In-House Management Education	85	60	82	77
Money for Outside Training	94	60	82	83
Time off for Career-Related Education	75	45	63	77

Table 8: MANAGERIAL RESPONDENTS' VIEWS ON THE
QUALITIES IMPORTANT IN THEIR SUPERVISORS AND MANAGERS

Quality	Rating
ability to make quick decisions	(3.97)
emotional stability	(4.32)
willingness to delegate authority	(4.28)
accessibility	(4.13)
knowledge of corporate policies	(3.66)
rapport with employees	(4.11)
the confidence of executive management	(4.51)
ability to interface with users	(4.13)
ability to interface with vendors	(3.31)
knowledge of corporate goals	(4.42)
technical expertise	(3.36)

(5) very important
(4) important
(3) neutral
(2) unimportant
(1) very unimportant

substantially more important in their immediate bosses than did

lower-level employees. They considered technical expertise and

rapport with employees to be less important, and user interface,

knowledge of corporate policies, emotional stability and quick

decision-making abilities to be only slightly more important than the

lower-level respondents. (See Table 8.)

Some authors have emphasized the specific ways in which I/S

professionals should go about planning their own careers. This body

of literature speaks to an employee's self-understanding -- his/her

identification of the job qualities that appear to be particularly

important. But top management's understanding of its personnel, of

their needs and of their motivations, should be prior

considerations. Employers are seldom involved in helping to define

and shape the careers of their I/S personnel to the degree that these

people would like such involvement.

If employers were more active in the development of I/S careers

(in the ways suggested by our survey responses, for example), two

important things would be accomplished. First, the immediate desires

of I/S personnel for more employer participation would be addressed

directly. The critical nature of this issue is emphasized by our

respondents' feelings of uncertainty about the requirements for

advancement within their own firms. (See Table 9.) Second, I/S

people would undoubtedly have an easier time structuring their own

career paths in accordance with their desires and with the long-term

needs of their organizations.

Neither the standard view of an I/S employee nor that of other

kinds of professionals adequately accounts for the reasons why some

people are happy in their jobs and some leave them. Perhaps more

interesting is the fact that salary almost invariably is _not_ the most
important, while "possibilities for growth" consistently _is_ the most
important factor deciding I/S personnel to leave their jobs and take
new ones. "Management problems" and "Career Development Problems"
are also important reasons why the respondents left their last jobs.
(See table 10.)

A number of our respondents had been offered jobs elsewhere,
but chose to remain with their current companies. Among the
non-managerial respondents, the most important factors causing them
to stay were "company location" and "personal reasons". The
managerial respondents turned down other jobs primarily because of
"company location" and "challenging position" (with current firm).
Do these results suggest any personnel policies to reduce turn-over?

Table 9:

Respondents' Understanding of how to Achieve
Career Advancement in General and Within Their Firms

(% in each category; aggregate)

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree	
I have a clear understanding of what skills I need to develop professionally	2	13	25	54	6	(100%)
I have a clear understanding of what skills I need to advance in this company	8	23	30	36	3	(100%)

"Company location" is a given, of course. But two courses of action
might be indicated. First, and most obviously, management could try
better to understand the "personal reasons" of the lower-level I/S

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Table 10: Respondents' Reasons for
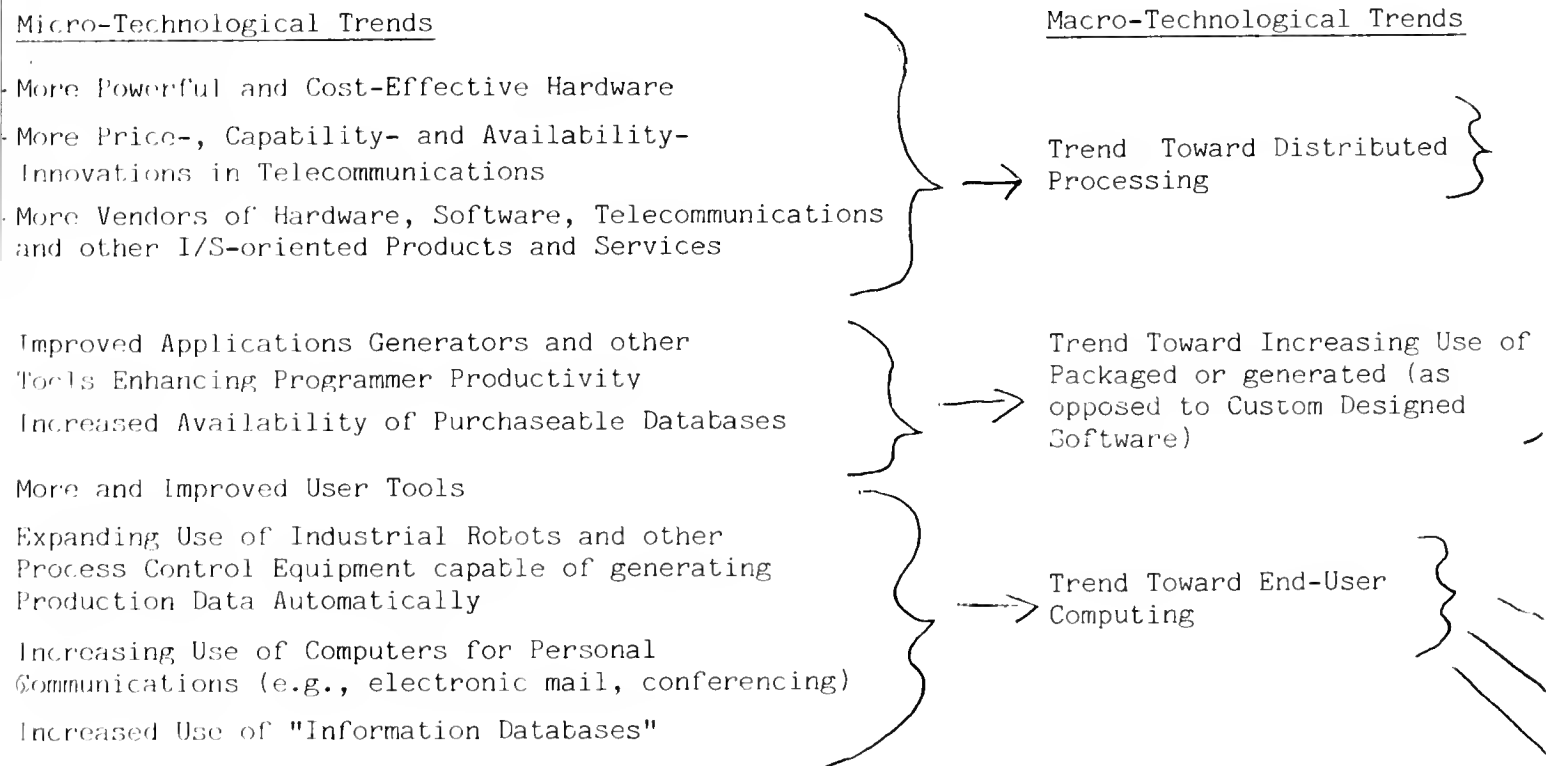Leaving Their Jobs; Managerial and Non-Managerial

% Considering Important Reason	NON-MANAGERIAL					MANAGERIAL				
	Ranking	Programmer	Systems Analyst	Technical Staff	Project Leader	Ranking	Project Manager	Systems Develp. Manager	Technical Staff Manager	I/S Directors
Boring Work	4	9	7.6	10.3	3.6	5	10.3	3.6	6.6	4
Salary	2	10.3	13	13.6	16.3	2	12.3	15.6	12	13.6
Too Little Growth Opportunities	1	14.3	15.6	12.5	22.3	1	18.3	15	23.6	19.6
Attractive Offer at Another Firm	3	12.3	9.6	9.3	8.3	3	10.4	12	10.6	14
Not Enough Challenges	8	6	6.3	3.3	6	4	7.6	9	7.3	5.6
Personal Reasons	7	4.3	6.3	10	5.6	8	5.6	1.3	10	4
Bureaucracy	10	5	3.3	4.3	2.6	10	3	3.3	2.6	2.6
Management Problems	5	5.3	7.3	7.6	9.3	7	6.6	6.3	3.6	5
Work Environment	9	5.6	6	2	6	9	2	5.6	4	5
Not Enough Career Development	6	10	5.3	4.3	8.3	6	3.3	5	4	10

professionals (i.e., family or health related problems). Second,
they can attempt to shape careers and I/S positions in such a way as
to increase the challenging aspects of the lower-level professionals'
jobs, since for the time being such challenges seem important in
maintaining only higher level I/S professionals.

The context in which the motivations and aspirations of I/S
professionals should be considered is that of medium- and long-term
human resource planning (HRP), taking into account the I/S personnel
resources currently available, and projected needs for future I/S
developments and personnel requirements. But the starting point for
this kind of planning is the dynamic technological basis of the I/S
field. Technical changes have already become evident: these include
the move into distributed processing, the increasing power and
sophistication of users and the growing need for consultant skills
within I/S departments. (See Figure 1.) All these changes require
shifts in the job content of the individual I/S professional, and in
the skills mix within a firm's I/S department or division.
Management's task will be to bring the structural make-up of I/S into
line with these technological dynamics.

Having pin-pointed the technological basis for structuring I/S
departments/divisions the next step is to consider the ways in which
MIS is connected to the rest of the firm, and the incentive
structures that inform I/S-user relationships. Many authors have
recently suggested that I/S should be run as a separate profit center
within the firm to increase the quality of I/S services through
financial incentives. (Thackray 1982, Lauer and Sbarbaro 1982,
McKenney and McFarlan 1982, Davis 1978, Barocci and Wever 1983) This
can imply a particular kind of management style which downplays the

Figure 1: Technological Trends in the I/S Field:
Micro-Trends, Macro-Trends and the
Human Resource Policies Implied

Micro-Technological Trends

- More Powerful and Cost-Effective Hardware
- More Price-, Capability- and Availability-
  Innovations in Telecommunications
- More Vendors of Hardware, Software, Telecommunications
  and other I/S-oriented Products and Services

Improved Applications Generators and other
Tools Enhancing Programmer Productivity

Increased Availability of Purchaseable Databases

More and Improved User Tools

Expanding Use of Industrial Robots and other
Process Control Equipment capable of generating
Production Data Automatically

Increasing Use of Computers for Personal
Communications (e.g., electronic mail, conferencing)

Increased Use of "Information Databases"

Macro-Technological Trends

Trend Toward Distributed
Processing

Trend Toward Increasing Use of
Packaged or generated (as
opposed to Custom Designed
Software)

Trend Toward End-User
Computing

(Sources: Rockart, Ball & Buller, 1982; Lahey, 1982; Barocci, Lahey & Wever, 1983)

creative freedom of I/S personnel in favor of emphasizing cost and
project deadline pressures. On the other hand, the accepted
understanding of the psychological predilections of I/S professionals
may suggest a less pressured management style focusing on supportive
and informal human resource management approaches. (Goldstein, 1983)
The literature on I/S personnel and management practices abounds with
such potentially conflicting pieces of advice. If for no other
reason, it becomes critical for top management to look to the firm
itself for guidelines as to how I/S should be structured and operated.

Another imporant question is whether it makes more sense to
maintain functional I/S departments or to structure I/S along
divisional lines. When the parent organization is mature and
complex, divisional I/S structures are better for the firm itself and
for I/S personnel. Employees in functional organizations are more
satisfied when their organizational mission is focused on a limited
number of users with similar technological needs. Here employee
satisfaction is connected largely with task-related factors. In
divisional structures I/S job satisfaction is positively correlated
with more general issues like relations with co-workers and career
counseling. These are of course just the issues which are amenable
to managerial influence. Thus, when possible and appropriate, I/S
managements should opt for divisional organization. (McKenny and
McFarlan 1982, Westcott 1983, Grindlay 1982)

Conclusion

I/S careers must be structured in the context of the firm's
overall structure and strategy, and of the projections top management
makes on the basis of technological changes and other kinds of

environmental dynamics. The following sets of factors should be
taken into account when any firm attempts to devise a new strategy
for managing and developing the careers of its I/S personnel:

--   I/S professionals desire more employer involvement in
      their career developments; this provides a clear
      opportunity for management to try minimizing turn-over and
      raising productivity.

--   I/S professionals want regular career-related counseling
      with their managers; a hands-off approach or a personnel
      department approach heightens the risks of turn-over and
      dissatisfied I/S employees.

--   I/S professionals have specific ideas of what sorts of
      career-development programs they want; among these are
      both technical and management education, in-house.

--   Lower-level I/S professionals value, among other things,
      emotional stability in their managers; higher-level I/S
      professionals value managers who have the confidence of
      executive management; top management can and should
      consider these (and other) preferences in the appointment
      of I/S managers and personnel at every level.

--   I/S professionals take jobs with competing firms not just
      because of higher salaries, but because of better growth
      opportunities; they often refuse offers from competing
      firms on the basis of the challenge in their current jobs;
      but lower-level I/S professionals are less challenged in
      this respect than I/S managers.

--   The motivations and aspirations of I/S professionals are
      not so specific as to rule out human resource planning
      techniques that simultaneously

      --   anticipate technological changes in the I/S field, and

      --   meet many of the needs and desires of I/S
            professionals that have typically been neglected or
            misunderstood in the past.

We began by re-examining the question of whether I/S
professionals are indeed as difficult to manage and to integrate
within an organization as conventional wisdom would have it. Our
major conclusion, then, is that while these employees are
qualitatively different from others, it is likely that the standard

"hands-off" management styles that have been applied to them have perpetuated -- if not created -- the 'problem' nature of I/S human resource management.

At the same time, we discovered that the dynamics of technological change within the I/S field necessitate better management, fast, for at least two reasons. First, I/S professionals will continue to be in high demand and short supply, while the need for competent I/S professionals intensifies along with the growing importance of I/S within a wide variety of firms and industrial sectors. Second, technological trends will impose a substantially different set of demands on I/S departments/divisions than have had to be met over the past decade. For these reasons, the structuring of I/S careers and the creation of the appropriate organizational structure and environment are necessary and desirable from the standpoint of both the I/S professional and the firm itself. The purpose of this paper will have been accomplished if the reader now considers such restructuring to be not just necessary and desirable, but also possible.

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